

WHAT IS CLAIMED IS:

- 5 1. A contaminated liquid mixing apparatus, comprising:
 a reactor head;
 a down tube extending from the reactor head and in fluid
communication therewith; and
 a plurality of ports formed in the reactor head and configured to impart
a spinning motion to a flow of liquid as it passes from the reactor head into the
10 down tube, wherein each port is adapted to receive a flow restrictor to permit
selective control of velocity and flow volume of the liquid through the down tube.
2. The apparatus of claim 1, including an inlet in the reactor head and
a receiving chamber within the reactor head in fluid communication with the inlet
15 and the plurality of ports.
3. The apparatus of claim 2, including a cartridge disposed within the
receiving chamber defining the plurality of ports.
- 20 4. The apparatus of claim 3, wherein the cartridge comprises a
plurality facets, and wherein the plurality of ports are formed in at least one of
the facets.
5. The apparatus of claim 4, wherein ports are formed in each facet
25 of the cartridge.
6. The apparatus of claim 3, wherein the cartridge is removably
disposed within the receiving chamber.

7. The apparatus of claim 3, wherein the reactor head includes means for accessing the receiving chamber and cartridge.

5 8. The apparatus of claim 7, wherein the accessing means comprises a removable lid.

9. The apparatus of claim 1, including a gas injection port formed in the reactor head.

10 10. The apparatus of claim 9, wherein the gas injection port is formed in a removable lid of the reactor head.

11. The apparatus of claim 1, wherein the flow restrictor comprises a removable flow restriction plug.

15 12. The apparatus of claim 11, wherein at least one flow restriction plug includes a liquid passageway.

20 13. A contaminated liquid mixing apparatus, comprising:
a reactor head including an inlet and a receiving chamber in fluid communication with the inlet;

a down tube extending from the reactor head and in fluid communication therewith;

25 a plurality of ports formed in the reactor head and in fluid communication with the receiving chamber, the ports being configured to impart a spinning motion to a flow of liquid as it passes from the reactor head into the down tube, wherein each port is adapted to receive a removable flow restriction plug to permit selective control of velocity and flow volume of the liquid through the down tube.

30

14. The apparatus of claim 13, including a cartridge disposed within the receiving chamber defining the plurality of ports.

5 15. The apparatus of claim 14, wherein the cartridge comprises a plurality facets, and wherein the plurality of ports are formed in at least one of the facets.

10 16. The apparatus of claim 14, wherein the cartridge is removably disposed within the receiving chamber.

17. The apparatus of claim 13, wherein the reactor head includes means for accessing the receiving chamber and cartridge.

15 18. The apparatus of claim 17, wherein the accessing means comprises a removable lid.

19. The apparatus of claim 13, including a gas injection port formed in the reactor head.

20 20. The apparatus of claim 13, wherein at least one flow restriction plug includes a liquid passageway.

21. A contaminated liquid mixing apparatus, comprising:
a reactor head including a liquid inlet and a receiving chamber in fluid
25 communication with the inlet;
a gas injection port formed in the reactor head;
a down tube extending from the reactor head and in fluid communication therewith;
a cartridge disposed within the receiving chamber having a plurality of
30 ports in fluid communication with the receiving chamber, the ports being

configured to impart a spinning motion to a flow of liquid as it passes from the reactor head into the down tube, wherein each port is adapted to receive a removable flow restriction plug to permit selective control of velocity and flow volume of the liquid through the down tube.

5

22. The apparatus of claim 21, wherein the cartridge comprises a plurality facets, and wherein the plurality of ports are formed in at least one of the facets.

10

23. The apparatus of claim 21, wherein the cartridge is removably disposed within the receiving chamber.

24. The apparatus of claim 21, wherein the reactor head includes means for accessing the receiving chamber and cartridge.

15

25. The apparatus of claim 24, wherein the accessing means comprises a removable lid.

20

26. The apparatus of claim 21, wherein at least one flow restriction plug includes a liquid passageway.